Alabama Department of Environmental Management

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Operating and Maintaining Underground Storage Tank Systems

Practical Help and Checklists

Printed on Recycled Paper

Contents

DISCLAIMER

This document provides information on operating and maintaining underground storage tank (UST) systems. The document is not a substitute for Alabama Department of Environmental Management (ADEM) regulations nor is it a regulation itself and it does not impose legally binding requirements.

For regulatory requirements regarding UST systems, refer to the ADEM's regulations governing UST systems (ADEM Admin. Code Rule 335-6-15).

How to Use This Booklet

Who Should Read This Booklet?

This booklet is for owners and operators of underground storage tank systems (USTs).

You are responsible for making sure your USTs comply with federal, state, and local regulations. This booklet can help you meet these UST responsibilities.

Key Terms Used in This Booklet

An Underground Storage Tank (UST) is a tank and underground piping connected to the tank that has at least 10 percent of its combined volume underground. The state regulations apply only to USTs storing petroleum or certain hazardous substances.

Operation and Maintenance (O&M) stands for operation and maintenance procedures that must be followed to keep USTs from causing leaks and creating costly cleanups.

What Can This Booklet Help You Do?

- Identify and understand the operation and maintenance (O&M) procedures you need to follow routinely to make sure you are in compliance with UST regulations and avoid serious leaks or spills that damage the environment or endanger human health.
- Identify good O&M procedures you can use to avoid cleanup costs and liability concerns.
- Maintain useful records of your O&M.

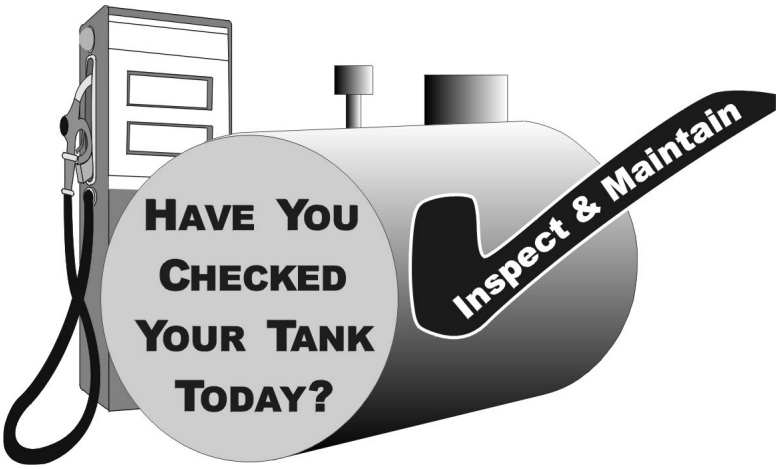
Now That Your UST System is "New" or "Upgraded", is That Enough?

Being "new" or "upgraded" is NOT enough. New and upgraded USTs are made of a complex collection of mechanical and electronic devices that can fail under certain conditions. These failures can be prevented or quickly detected by following routine O&M procedures. Having a new or upgraded UST system is a good start, but the system must be properly operated and continuously maintained to ensure that leaks are avoided or quickly detected.

What Should You Do with Each Section of This Booklet?

Read through each section carefully and use the checklists to help you establish clear O&M procedures.

By identifying and understanding the O&M tasks you need to perform routinely, you will ensure timely repair or replacement of components when problems are identified.



How Can You Use the Following Checklists Effectively?

This booklet's pages are 3-hole punched and unbound so you can put all the materials in a handy 3-ring binder. You can easily remove any of the following checklists from the binder, reproduce them, and then fill them out.

You can select the specific mix of checklists that matches your UST facility. Once you have your select group of checklists together, make several copies that you can fill out periodically over time.

In this way you can keep track of your O&M activities and know that you've done what was necessary to keep your UST site safe and clean, avoiding any threats to the environment or nearby people as a result of costly and dangerous UST leaks. This will also help you remain in compliance with UST regulations and avoid penalties resulting from not complying with the regulatory requirements.

USE THIS BOOKLET OFTEN.

EFFECTIVE O&M REQUIRES CONSTANT VIGILANCE!

Want to help improve this O&M Manual?

We want to continually improve this O&M Manual with your help!

Send us your feedback.

Let us know if you find any errors, think something needs to be added or deleted, or have suggestions on format or checklist changes.

- Send feedback by e-mail to Grdh2omail@adem.state.al.us
- Send feedback by regular mail to
  ADEM/Groundwater Branch
  Post Office Box 301463
  Montgomery, Alabama 36130-1463

SECTION 1
Identifying the Equipment at Your UST Facility

Determine what UST equipment you have at your facility by completing the checklist below. Note that each part of the checklist below refers you to the appropriate section of this O&M booklet for relevant information. After you have identified your equipment, proceed to the following sections to identify the O&M actions necessary for your specific UST system.

General Facility Information (optional)

Facility Name		
Facility ID #	- -	

Leak Detection (See Section 2 for information on leak detection)

A. Leak Detection for Tanks

Check at least one for each tank:	Tank #1	Tank #2	Tank #3	Tank #4
☐ Monthly Interstitial Monitoring of Secondary Containment (Double Wall or Lined Pit) – see pg 7				
☐ Monthly Statistical Inventory Reconciliation (SIR) – see pg 9				
☐ Monthly Soil Vapor Monitoring– see pg 10				
☐ Monthly Groundwater Monitoring– see pg 11				
☐ Monthly Continuous Automatic Tank Gauging (CATG) – see pg 12				
☐ Monthly Inventory Control & Automatic Tank Gauging (ATG) – see pg 13				
☐ Monthly Inventory Control & Tank Tightness Testing (TTT)* – see pg 14				
☐ Monthly Manual Tank Gauging Only ** – see pg 17				
☐ Monthly Manual Tank Gauging & Tank Tightness Testing (TTT)*** – see pg 18				

* Allowed only for 10 years after installing tank, or upgrading tank with corrosion protection. TTT required every 5 years.
** Allowed only for tanks of 1000 gallon capacity or less.
*** Allowed only for tanks of 2,000 gallon capacity or less and only for 10 years after upgrading or installing tank with corrosion protection. TTT required every 5 years.

B. Leak Detection for Pressurized Piping

Check at least one from A & B for each tank's piping:		Tank #1	Tank #2	Tank #3	Tank #4
A (Automatic Line Leak Detectors)	☐ Automatic Flow Restrictor– see pg 20				
	☐ Automatic Shutoff Device– see pg 20				
	☐ Continuous Alarm System (Not allowed after 8/6/08)– see pg 20				
B	☐ Line Tightness Test– see pg 21				
	☐ Monthly Interstitial Monitoring of Secondary Containment Area – see pg 7				
	☐ Monthly Statistical Inventory Reconciliation (SIR) – see pg 9				
	☐ Monthly Soil Vapor Monitoring– see pg 10				
	☐ Monthly Groundwater Monitoring– see pg 11				

C. Leak Detection for Suction Piping

Check at least one for each tank's piping:	Tank #1	Tank #2	Tank #3	Tank #4
☐ Line Tightness Testing Every Three Years– see pg 21				
☐ Monthly Interstitial Monitoring of Secondary Containment – see pg 7				
☐ Monthly Statistical Inventory Reconciliation (SIR) – see pg 9				
☐ Monthly Soil Vapor Monitoring– see pg 10				
☐ Monthly Groundwater Monitoring– see pg 11				
☐ No Leak Detection Required For "Safe" Suction Piping * – see pg 22				
* No leak detection required only when all requirements on pg 22 are met.				

Spill and Overfill Protection (See Section 3 for more information)

Check for each tank:	Tank #1	Tank #2	Tank #3	Tank #4
Spill Catchment Basin/ Spill Bucket– see pg 24				
Check at least one overfill device for each tank:				
Automatic Shutoff Device– see pg 26				
Electronic Overfill Alarm– see pg 27				
Ball Float Valve– see pg 28				

Containment Sumps (See Section 4 for more information)

Check for each tank:	Tank #1	Tank #2	Tank #3	Tank #4
Submersible Pump Containment Sump– see pg 32				
Transition or Intermediate Sump– see pg 32				
Check for each dispenser:	**Disp. #1**	**Disp. #2**	**Disp. #3**	**Disp. #4**
Under Dispenser Containment Sump–see pg 32				

Corrosion Protection (See Section 5 for more information)

A. Corrosion Protection for Tanks

Check at least one for each tank:	Tank #1	Tank #2	Tank #3	Tank #4
Coated & Cathodically Protected Steel (STI-P3)– see pg 35 & 37				
Noncorrodible Material (such as Fiberglass Reinforced Plastic) – see pg 35				
Steel Jacketed or Clad with Noncorrodible Material– see pg 35				
Cathodically Protected Noncoated Steel*– see pg 35 & 38				
Internally Lined Tank*– see pg 35 & 40				
Cathodically Protected Noncoated Steel & Internally Lined Tank* – see pgs 35, 38, 40 & 41				

*** These options may be used only for tanks installed before December 22, 1988.**

A. Corrosion Protection for Piping

Check at least one for each:	Tank #1	Tank #2	Tank #3	Tank #4
Coated and Cathodically Protected Steel– see pg 35 & 37				
Nonmetallic, Noncorrodible Material (such as Fiberglass Reinforced Plastic) – see pg 35				
Nonmetallic, Noncorrodible Material (such as Flexible Plastic) – see pg 35				
Cathodically Protected Noncoated Metal*– see pg 35 & 38				

*** This option may be used only for piping installed before December 22, 1988.**

Any Problems Filling Out This Checklist?

If you have trouble filling out this checklist or any following checklist, remember these sources of assistance you can contact:

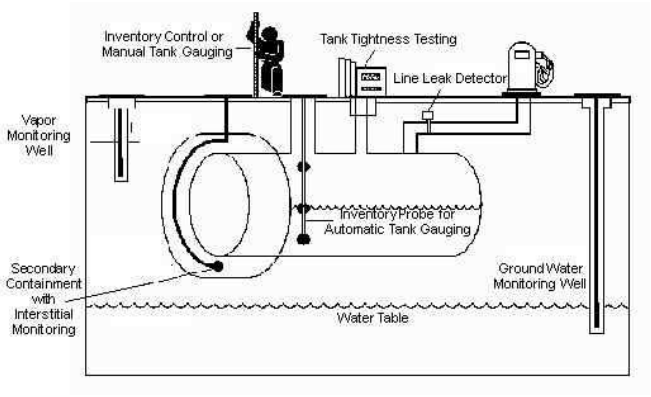
- Your UST contractor, the vendor of your equipment, and the manufacturer of your UST equipment should be ready to help you. Look through your records for contact information. You may also want to use some of the industry contacts and other contact information provided in Section 8.

- ADEM may be able to help you identify equipment or sources of information about your UST equipment.

SECTION 2
Leak Detection

What is Leak Detection?

You must be able to determine at least every 30 days whether or not your tank and piping are leaking by using proper leak detection methods.



Your leak detection method must be able to detect a leak from any portion of the tank and connected underground piping that routinely contains product.

Leak detection must be installed, calibrated, operated, and maintained according to the manufacturer's instructions.

Do You Know if Your Leak Detection is Acceptable for Use at Your UST Site?

Leak detection methods must meet specific performance requirements. Vendors and manufacturers must perform a "third party" test on their leak detection equipment and have the "third party" evaluator certify that performance requirements are met. An independent work group of leak detection experts periodically evaluates all third-party certifications and provides a list of third party evaluated leak detection equipment. Only leak detection equipment on this list is acceptable for use in the State of Alabama. The list is available on the Internet at www.nwglde.org. If you are unable to locate this list, contact the UST Compliance Unit at 334/270-5655.

Also, by checking the list, you may discover the method you use is not acceptable for use with the type of tank or piping you have, or the type of product being stored. For example, you may learn from the certification that your method won't work with manifolded tanks, certain products, high throughput, or with certain tank sizes.

That's why you need to make sure your leak detection method has clear certification that it will work effectively at your site with its specific characteristics.

How Can You Make Sure Your Leak Detection System is Working at Your UST Site?

If you don't understand your leak detection O&M responsibilities and don't know what O&M tasks you must routinely perform, you may allow your UST site to become contaminated. As a result, you may face cleanup costs and associated problems.

To avoid these problems use the checklists on the following pages that describe each type of leak detection method, discuss actions necessary for proper O&M, and note the records you should keep.

Locate the methods of leak detection you are using at your facility, review these pages, and periodically complete the checklist. You might want to copy a page first and periodically fill out copies later.

You will find leak detection log sheets, record sheets and worksheets in the following pages of this section. Keeping these records increases the likelihood that you are conducting good O&M and providing effective leak detection at your UST site. ADEM leak detection reporting forms that you may be required to submit can be found on ADEM's web site at www.adem.alabama.gov.

If you ever suspect or confirm a leak, refer to Section 6.

Questions about your Leak Detection system?

If you have questions about your leak detection system, review your owner's manual or call the vendor of your system. The ADEM UST Compliance Unit may be able to provide assistance as well.

NEVER IGNORE LEAK DETECTION ALARMS OR FAILED LEAK DETECTION TESTS TREAT THEM AS POTENTIAL LEAKS!

What Should You Do to Operate and Maintain your Secondary Containment Interstitial Monitoring System?

Secondary containment is a barrier between the portion of an UST system that contains product and the outside environment. Examples of secondary containment are double wall tanks and double wall piping. The area between the inner and outer walls, called the interstitial space, can be an open or closed system, and can be monitored manually or automatically for evidence of a leak. An open system is at atmospheric pressure and a closed systems is under vacuum or pressure.

Electronic monitoring equipment must have been 3rd party certified and approved by ADEM. Call ADEM if you are unsure whether or not the equipment you are using is approved.

Interstitial Monitoring of Secondary Containment (Double wall, or Lined Pit or Trench) (for tanks & piping)	
Perform These O&M Actions	❑ **Monitor all interstitial spaces and record the results at least every 30 days.** If monitoring is conducted automatically by an electronic sensing device, the status of the device (power light on, alarm light off, etc.) should be checked every month and results of the status check recorded. If monitoring consists of a visual inspection, you can document the results on the "ADEM Manual Interstitial Monitoring Monthly Log" form on the next page, or an equivalent form. Testing more often than monthly can catch leaks sooner and reduce cleanup costs and problems. ❑ **Frequently test your leak detection system according to the manufacturer's instructions to make sure it is working properly.** Don't assume that your leak detection system is working and never needs checking. Read your owner's manual, run the appropriate tests, and see if your system is set up and working properly. Some interstitial monitoring systems have a "test" or "self-diagnosis" mode that can easily and routinely run these checks. ❑ **Periodically have a qualified UST contractor, such as the vendor who installed your leak detection system, service all the system components according to the manufacturer's service instructions.** Tank probes and other components can wear out and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. ❑ **Keep interstitial monitoring access ports clearly marked and secured.** ❑ **Check your interstitial monitoring system owner's manual often to answer questions and to make sure you know the system's O&M procedures.** Call the system's vendor or manufacturer for a copy of the owner's manual if you don't have one. ❑ **Make sure employees who run, monitor, or maintain the leak detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **Keep results of your leak detection system tests for at least 1 year.** Your monitoring equipment may provide printouts that can be used as records. If you monitor manually, you can use the "ADEM Manual Interstitial Monitoring Monthly Log" form which is included on the next page. *Unless you are recording actual leak detection results at least every 30 days and maintaining records for at least 1 year, you are not doing leak detection right.* ❑ **Keep all records of calibration, maintenance, and repair of your leak detection equipment for at least 1 year.**
Report a Suspected Leak	❑ **If you have an indication that product has leaked outside of any secondary containment area, see Section 6 of this booklet for information on what to do next.** A suspected release is when any evidence of product is present outside of the tank or piping or liner, or there is evidence of unusual/erratic operating conditions.

ADEM
MANUAL INTERSTITIAL MONITORING
MONTHLY LOG FOR YEAR _____

Questions on how to complete this form should be directed to the Groundwater Branch, UST Compliance Unit at (334) 270-5655

Owner Information	
Facility Name:	Owner:
Address:	Address:
City, County, Zip Code:	City, State, Zip Code:
Facility I.D. Number:	Phone Number:

Tank System Information	
Unique Tank Number:	Type of Product in Tank:
Tank Size:	Double Wall Piping, circle one: (Yes) (No)
Tank Material, circle one: (Steel) (Fiberglass)	Piping Material, circle one: (Steel) (Plastic) (Fiberglass)

INTERSTITIAL MONITORING LOG

1. For Sumps and Tank Interstitial Space (if applicable): Designate "P" for product, "W" for water, "P" and "W" for both, and "D" for dry.
2. If "P" or "W" or both are indicated, include depth of each in inches.

Month	Date Monitored	Monitor's Initials	Tank Interstitial Space	Piping Sump #1	Piping Sump #2 (if applicable)	Dispenser Sump (if applicable)
January						
February						
March						
April						
May						
June						
July						
August						
September						
October						
November						
December						

Date of any Repairs or Tightness Tests	**Description of any Repairs or Tightness Tests**

Comments
(Include information on liquid removal and disposal from sumps, if applicable.)

What Should You Do to Operate and Maintain your Statistical Inventory Reconciliation (SIR) Monitoring Method?

SIR is a method in which a trained professional uses sophisticated computer software to conduct a statistical analysis of inventory, delivery, and dispensing data. You must supply the professional with data every month. The result of the analysis may be PASS, INCONCLUSIVE, or FAIL.

SIR systems must have been 3rd party certified and approved by ADEM. Call ADEM if you are unsure whether or not the equipment you are using is approved.

Statistical Inventory Reconciliation (SIR) (for tanks & piping)	
Perform These O&M Actions	❑ **Supply daily inventory data to your SIR vendor at least every 30 days.** The vendor will provide you with your leak detection results after the statistical analysis is completed. ❑ **If you receive a "fail" or "inconclusive" result, you must work with your SIR vendor to correct the problem and document the results of an investigation.** Complete and submit the "ADEM Monthly SIR Report" Form # 414 and the "ADEM SIR 7 Day Release Investigation Report" Form # 460 to ADEM. These forms are available from ADEM's web site at www.adem.alabama.gov. If you cannot resolve the problem, treat the inconclusive result as a suspected leak and refer to the bottom of this checklist. ❑ **If you use an ATG system to gather data for the SIR vendor, periodically have a qualified UST contractor, such as the vendor who installed your ATG, service all the ATG system components according to the manufacturer's service instructions.** Tank probes and other components can wear out and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. Do this according to manufacturer's instructions. See the checklist for ATG systems on page 13. ❑ **If you stick your tank to gather data for the SIR vendor, make sure your stick can measure to one-eighth of an inch and can measure the level of product over the full range of the tank's height.** You should check your measuring stick periodically to make sure that you can read the markings and numbers and that the bottom of the stick is not worn. ❑ **Ensure that your product dispenser is calibrated at least annually according to local standards or to an accuracy of 6 cubic inches for every 5 gallons of product withdrawn.** ❑ **If you stick your tank, measure the water in your tank to the nearest one-eighth inch and record the results at least monthly. If you use an ATG system, record the water reading at least once a month.** You can use a paste on the measuring stick that changes color when it comes into contact with water. If there is no water, be sure to write "0" in your records to document that you did check for water. ❑ **Make sure employees who run, monitor, or maintain the leak detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **Keep results of your SIR tests for at least 1 year.** The "ADEM Annual SIR Summary Report" Form # 326 must be kept on file and a copy submitted to ADEM by January 31st of each year. *Unless you are keeping records of the 30-day leak detection results and maintaining those records for at least 1 year, you are not doing leak detection right.* ❑ **If you use an ATG system to gather the SIR data, keep all records of calibration, maintenance, and repair of your leak detection equipment for at least 1 year.** ❑ **Keep the records of investigations conducted as a result of any monthly monitoring conclusion of "Inconclusive" or "Fail" for at least 1 year.** This may include the results of a tightness test performed during the investigation or a re-evaluation based on corrected delivery or dispenser data.
Report a Suspected Leak	❑ **See Section 6 of this manual if the SIR results indicate a suspected release and submit the "ADEM Monthly SIR Report" Form # 414 and "ADEM SIR 7 Day Release Investigation Report" Form # 460 to ADEM.** A suspected release is when the results of a 7 day investigation indicate that a leak has occurred, failure to pass 2 months in a row and the investigation does not indicate a leak, or evidence of unusual/erratic operating conditions.

What Should You Do to Operate and Maintain your Soil Vapor Monitoring System?

Soil vapor monitoring measures product vapors in the soil at the UST site to check for a leak.

NOTE: soil vapor monitors will not work well with substances that do not easily vaporize (such as diesel fuel) and at sites with high vapor levels (>1,000 ppm) due to previous contamination.

Soil Vapor monitoring equipment must have been 3rd party certified and approved by ADEM. Installation plans and specifications must have been prepared by an Alabama registered professional engineer and approved by ADEM prior to installation. Call ADEM if you are unsure whether or not your equipment and installation are approved.

Soil Vapor Monitoring (for tanks & piping)	
Perform These O&M Actions	❑ **Monitor <u>all</u> of your vapor monitoring wells and record the results at least every 30 days.** If monitoring is conducted automatically by an electronic sensing device, the status of the device (power light on, alarm light off) should be checked every month and results of the status check recorded. If monitoring consists of manual testing using a portable monitor, a log documenting the results must be maintained. Testing more often than monthly can catch leaks sooner and reduce cleanup costs and problems. ❑ **Frequently test your leak detection system according to the manufacturer's instructions to make sure it is working properly.** Don't assume that your leak detection system is working and never needs checking. Some electronic soil vapor monitoring systems have a "test" or "self-diagnosis" mode. If you have components (such as monitoring equipment, probes or sensors) for your soil vapor monitoring system, read your manual and test your equipment to see if it is working properly. Portable equipment used to manually monitor wells should be periodically checked to make sure it is working properly. ❑ **Periodically have a qualified UST contractor, such as the vendor who installed your leak detection system, service all the system components according to the manufacturer's service instructions.** Probes and other components can wear out and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. ❑ **Keep your soil vapor monitoring wells clearly marked and secured.** A black triangle on a white background is the standard monitoring well marking. Locks are recommended but deteriorate rapidly in the moist underground environment. "Secure" is generally interpreted to mean requiring a tool to open. ❑ **Check your soil vapor monitoring system owner's manual often to answer questions and to make sure you know the system's operation and maintenance procedures.** Call the system's vendor or manufacturer for a copy of the owner's manual if you don't have one. ❑ **Make sure employees who run, monitor, or maintain the leak detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **Keep results of your leak detection system tests for at least 1 year.** Your monitoring equipment may provide printouts that can be used as records. If you monitor manually, keep your logbook as a record. *Unless you are recording actual leak detection results at least every 30 days and maintaining records for at least 1 year, you are not doing leak detection right.* ❑ **Keep all records of calibration, maintenance, and repair of your leak detection equipment for at least 1 year.**
Report a Suspected Leak	❑ **If your soil vapor monitoring ever fails a test or indicates a suspected release, see Section 6 of this booklet for information on what to do next.** A suspected release is when there is a significant increase in vapor levels above the background level established by the plans and specifications approved by ADEM, or there is evidence of unusual/erratic operating conditions.

What Should You Do to Operate and Maintain your Groundwater Monitoring System?

Groundwater monitoring looks for the presence of liquid product floating on the groundwater at the UST site.

NOTE: this method cannot be used at sites where groundwater is more than 20 feet below the surface.

Groundwater monitoring equipment must have been 3rd party certified and approved by ADEM. Installation plans and specifications must have been prepared by an Alabama registered professional engineer and approved by ADEM prior to installation. Call ADEM if you are unsure whether or not your equipment and installation are approved.

Groundwater Monitoring (for tanks & piping)	
Perform These O&M Actions	❑ **Monitor <u>all</u> of your groundwater monitoring wells and record the results at least every 30 days.** If monitoring is conducted automatically by an electronic sensing device, the status of the device (power light on, alarm light off) should be checked every month and results of the status check recorded. If monitoring consists of manual testing, a log documenting the results must be maintained. Testing more often than monthly can catch leaks sooner and reduce cleanup costs and problems. ❑ **Frequently test your leak detection system according to the manufacturer's instructions to make sure it is working properly.** Don't assume that your leak detection system is working and never needs checking. Some electronic groundwater monitoring systems have a "test" or "self-diagnosis" mode. If you have components (such as monitoring equipment, probes or sensors) for your groundwater monitoring system, read your manual and test your equipment to see if it is working properly. Portable equipment used to manually monitor wells should be periodically checked to make sure it is working properly. ❑ **Periodically have a qualified UST contractor, such as the vendor who installed your leak detection system, service all the system components according to the manufacturer's service instructions.** Probes and other components can wear out and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. ❑ **Keep your groundwater monitoring wells clearly marked and secured.** A black triangle on a white background is the standard monitoring well marking. Locks are recommended but deteriorate rapidly in the moist underground environment. "Secure" is generally interpreted to mean requiring a tool to open. ❑ **Check your groundwater monitoring system owner's manual often to answer questions and to make sure you know the system's operation and maintenance procedures.** Call the system's vendor or manufacturer for a copy of the owner's manual if you don't have one. ❑ **Make sure employees who run, monitor, or maintain the leak detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **Keep results of your leak detection system tests for at least 1 year.** Your monitoring equipment may provide printouts that can be used as records. If you monitor manually, keep your logbook as a record. *Unless you are recording actual leak detection results at least every 30 days and maintaining records for at least 1 year, you are not doing leak detection right.* ❑ **Keep all records of calibration, maintenance, and repair of your leak detection equipment for at least 1 year.**
Report a Suspected Leak	❑ **If your groundwater monitoring ever indicates a suspected release, see Section 6 of this booklet for information on what to do next.** A suspected release is when there is evidence that tank contents are present in the well (odor, sheen, any amount of liquid product, or evidence of unusual/erratic operating conditions.

What Should You Do to Operate and Maintain Your Continuous Automatic Tank Gauging (CATG) System?

A continuous automatic tank gauging (CATG) system consists of a probe permanently installed in a tank and wired to a monitor to provide information on product level and temperature. CATG systems automatically collect product volume data and statistically analyze this data to determine if a tank is leaking.

CATG systems must have been 3rd party certified and approved by ADEM. Call ADEM if you are unsure whether or not the equipment you are using is approved.

Continuous Automatic Tank Gauging (CATG) (for tanks only)	
Perform These O&M Actions	❑ **Make sure your CATG system runs a test at least every 30 days.** CATG systems must collect data during "quiet times" when nothing is added or removed from the tank. If there is not enough "quiet time" within 30 days, the system will not be able to complete a test. Allowing the equipment to run as many tests as possible during the month can catch leaks sooner and reduce cleanup costs and problems. ❑ **Frequently test your CATG system according to the manufacturer's instructions to make sure it is working properly.** Don't assume that your leak detection system is working and never needs checking. Read your owner's manual, run the appropriate tests, and see if your CATG system is set up and working properly. Most CATG systems have a "test" or "self-diagnosis" mode that can easily and routinely run these checks. ❑ **Periodically have a qualified UST contractor, such as the vendor who installed your CATG, service all the CATG system components according to the manufacturer's service instructions.** Tank probes and other components can wear out and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. ❑ **Check your CATG system owner's manual often to answer questions and to make sure you know the CATG's operation and maintenance procedures.** Call the CATG manufacturer or vendor for a copy of the owner's manual if you don't have one. ❑ **Record the CATG water reading at least once a month.** If there is no water, be sure to write "0" in your records to document that you did check for water. ❑ **Make sure employees who run, monitor, or maintain the leak detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **Keep results of your CATG system tests for at least 1 year.** Your monitoring equipment may provide printouts that can be used as records. *Unless you are recording actual leak detection results at least every 30 days and maintaining records for at least 1 year, you are not doing leak detection right.* ❑ **Keep all records of calibration, maintenance, and repair of your leak detection equipment for at least 1 year.**
Report a Suspected Leak	❑ **If your CATG system ever indicates a suspected release, see Section 6 of this booklet for information on what to do next.** A suspected release is when the CATG test results indicate a leak, or there is evidence of unusual/erratic operating conditions.

What Should You Do to Operate and Maintain Your Inventory Control and Automatic Tank Gauging (ATG) System?

This method combines monthly inventory control with an automatic tank gauging (ATG) system consisting of a probe permanently installed in a tank and wired to a monitor to provide information on product level and temperature. ATG systems automatically calculate the changes in product volume that can indicate a leaking tank. Inventory control involves taking measurements of tank contents and recording the amount of product pumped each operating day, measuring and recording tank deliveries, and reconciling this data at least once a month.

ATG *systems must have been 3rd party certified and approved by ADEM. Call ADEM if you are unsure whether or not the equipment you are using is approved.*

Inventory Control and Automatic Tank Gauging (ATG) (for tanks only)	
Perform These O&M Actions	❑ **Take inventory readings and record the numbers at least each operating day that product is added to or taken out of the tank.** Record the readings on the "Daily Inventory Worksheet" on page 15, or on an equivalent form. You may want to obtain the booklet "Doing Inventory Right" from ADEM, which provides instructions on how to properly record and reconcile inventory readings. ❑ **Reconcile the fuel deliveries with delivery receipts by taking inventory readings before and after each delivery.** Reconcile these readings using the "Daily Inventory Worksheet" on page 15, or on an equivalent form. ❑ **Reconcile all your data at least every 30 days.** Reconcile these readings using the "Monthly Inventory Record" on page 16, or on an equivalent form. ❑ **Use your ATG system to test for leaks at least every 30 days.** Most systems are already programmed by the installer to run a leak test periodically. If your system is not programmed to automatically conduct the leak test, refer to your ATG system manual to identify which buttons to push to conduct the leak test. Testing more often than monthly can catch leaks sooner and reduce cleanup costs and problems. ❑ **Make sure that the amount of product in your tank is sufficient to run the ATG leak test.** The tank must contain a minimum amount of product to perform a valid leak detection test. The source for determining that minimum amount is the National Leak Detection List as discussed on page 5. ❑ **Frequently test your ATG system according to the manufacturer's instructions to make sure it is working properly.** Don't assume that your leak detection system is working and never needs checking. Read your owner's manual, run the appropriate tests, and see if your ATG system is set up and working properly. Most ATG systems have a "test" or "self-diagnosis" mode that can easily and routinely run these checks. ❑ **Periodically have a qualified UST contractor, such as the vendor who installed your ATG, service all the ATG system components according to the manufacturer's service instructions.** Tank probes and other components can wear out and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. ❑ **Check your ATG system owner's manual often to answer questions and to make sure you know the ATG's operation and maintenance procedures.** Call the ATG manufacturer or vendor for a copy of the owner's manual if you don't have one. ❑ **Ensure that your product dispenser is calibrated at least annually according to local standards or to an accuracy of 6 cubic inches for every 5 gallons of product withdrawn.** ❑ **Record the ATG water reading at least once a month.** If there is no water, be sure to write "0" in your records to document that you did check for water. ❑ **Make sure employees who run, monitor, or maintain the leak detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **Keep your inventory records and reconciliation results for at least 1 year.** *Unless you are recording actual leak detection results at least every 30 days and maintaining records for at least 1 year, you are not doing leak detection right.* ❑ **Keep results of your ATG system tests and all records of calibration, maintenance, and repair for at least 1 year.** Your ATG may provide test printouts that can be used as records.
Report a Suspected Leak	❑ **If your ATG system or inventory reconciliation ever indicate a suspected release, see Section 6 of this booklet for information on what to do next.** A suspected release is when a single ATG test result indicates a failed test, monthly inventory reconciliation exceeds 1% of amount pumped per month plus 130 gallons for two months in a row, or exceeds 1% of amount pumped per month plus 260 gallons for any one month, or there is evidence of unusual/erratic operating conditions.

What Should You Do to Operate and Maintain Your Inventory Control and Tank Tightness Testing Method?

This temporary method combines monthly inventory control with periodic tank tightness testing. Inventory control involves taking measurements of tank contents and recording the amount of product pumped each operating day, measuring and recording tank deliveries, and reconciling this data at least once a month. This combined method also includes tightness testing, a sophisticated test performed by trained professionals.

NOTE: This combination method can only be used temporarily for up to 10 years after installing a new UST prior to August 6, 2007 or for up to10 years after your tank is upgraded to meet the corrosion protection requirements.

Tank testing equipment must have been 3rd party certified and approved by ADEM. Call ADEM if you are unsure whether or not the equipment you are using is approved.

Inventory Control and Tank Tightness Testing (for tanks only)	
Perform These O&M Actions	❑ **Take inventory readings and record the numbers at least each operating day that product is added to or taken out of the tank.** Record the readings on the "Daily Inventory Worksheet" on the next page, or on an equivalent form. You may want to obtain the booklet "Doing Inventory Right" from ADEM, which provides instructions on how to properly record and reconcile inventory readings. ❑ **Reconcile the fuel deliveries with delivery receipts by taking inventory readings before and after each delivery.** Reconcile these readings using the "Daily Inventory Worksheet" on the next page, or on an equivalent form. ❑ **Reconcile all your data at least every 30 days.** Reconcile these readings using the "Monthly Inventory Record" on page 16, or on an equivalent form. ❑ **Have a tank tightness test conducted at least every 5 years.** This testing needs to be conducted by a professional trained and certified by the equipment manufacturer in performing tank tightness testing. Complete and submit the appropriate ADEM tightness test report Form #s 483-487 to ADEM. These forms are available from ADEM's web site at www.adem.alabama.gov. ❑ **Ensure that your measuring stick can measure to the nearest one-eighth inch and can measure the level of product over the full range of the tank's height.** You should check your measuring stick periodically to make sure that you can read the markings and numbers and that the bottom of the stick is not worn. ❑ **Ensure that your product dispenser is calibrated at least annually according to local standards or to an accuracy of 6 cubic inches for every 5 gallons of product withdrawn.** ❑ **Measure the water in your tank to the nearest one-eighth inch at least once a month and record the results on the reconciliation sheet.** You can use a paste that changes color when it comes into contact with water. If there is no water, be sure to write "0" in your records to document that you did check for water. ❑ **Make sure employees who run, monitor, or maintain the leak detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **Keep your inventory records and reconciliation results for at least 1 year.** *Unless you are recording actual leak detection results at least every 30 days and maintaining records for at least 1 year, you are not doing leak detection right.* ❑ **Keep the results of your most recent tightness test.** The appropriate ADEM tightness test report Form #s 483-487 must be kept on file and a copy submitted to ADEM.
Report a Suspected Leak	❑ **If your tank tightness testing or inventory reconciliation ever indicate a suspected release, see Section 6 of this booklet for information on what to do next.** A suspected release is when a single tank tightness test fails, monthly inventory reconciliation exceeds 1% of amount pumped per month plus 130 gallons for two months in a row, or exceeds 1% of amount pumped per month plus 260 gallons for any one month, or there is evidence of unusual/erratic operating conditions.

DAILY INVENTORY WORKSHEET

FACILITY NAME: _____

YOUR NAME: _____

DATE: _____

TANK IDENTIFICATION					
Type of Fuel					
Tank Size in Gallons					
END STICK INCHES					
AMOUNT PUMPED					
Totalizer Reading					
Totalizer Reading					
Totalizer Reading					
Totalizer Reading					
Totalizer Reading					
Totalizer Reading					
Totalizer Reading					
Totalizer Reading					
TODAY'S SUM OF TOTALIZERS					
Previous Day's Sum of Totalizers					
AMOUNT PUMPED TODAY					
DELIVERY RECORD					
Inches of Fuel Before Delivery					
Gallons of Fuel Before Delivery (from tank chart)					
Inches of Fuel After Delivery					
Gallons of Fuel After Delivery (from tank chart)					
GALLONS DELIVERED (STICK) [Gallons "After" - Gallons "Before"]					
GROSS GALLONS DELIVERED (RECEIPT)					

MONTHLY INVENTORY RECORD

TANK IDENTIFICATION & TYPE OF FUEL:_____

MONTH/YEAR :_____/_____

FACILITY NAME:_____

DATE OF WATER CHECK: _____ LEVEL OF WATER (INCHES):_____

DATE	START STICK INVENTORY (GALLONS)		GALLONS DELIVERED		GALLONS PUMPED		BOOK INVENTORY (GALLONS)	END STICK INVENTORY (INCHES)	END STICK INVENTORY (GALLONS)	DAILY OVER (+) OR SHORT (-) ["End" - "Book"]	INITIALS
1		(+)		(-)		(=)					
2		(+)		(-)		(=)					
3		(+)		(-)		(=)					
4		(+)		(-)		(=)					
5		(+)		(-)		(=)					
6		(+)		(-)		(=)					
7		(+)		(-)		(=)					
8		(+)		(-)		(=)					
9		(+)		(-)		(=)					
10		(+)		(-)		(=)					
11		(+)		(-)		(=)					
12		(+)		(-)		(=)					
13		(+)		(-)		(=)					
14		(+)		(-)		(=)					
15		(+)		(-)		(=)					
16		(+)		(-)		(=)					
17		(+)		(-)		(=)					
18		(+)		(-)		(=)					
19		(+)		(-)		(=)					
20		(+)		(-)		(=)					
21		(+)		(-)		(=)					
22		(+)		(-)		(=)					
23		(+)		(-)		(=)					
24		(+)		(-)		(=)					
25		(+)		(-)		(=)					
26		(+)		(-)		(=)					
27		(+)		(-)		(=)					
28		(+)		(-)		(=)					
29		(+)		(-)		(=)					
30		(+)		(-)		(=)					
31		(+)		(-)		(=)					
TOTAL GALLONS PUMPED >							**TOTAL GALLONS OVER OR SHORT >**				

DROP THE LAST 2 DIGITS from the PUMPED number and enter on the TOTAL GALLONS lines below

Compare these numbers

LEAK CHECK #1 _____ **+ 130 =** _____ **gallons**

LEAK CHECK #2 _____ **+ 260 =** _____ **gallons**

Is the "TOTAL GALLONS OVER OR SHORT" **LARGER** than "LEAK CHECK #1" result? **YES NO** (circle one)
If your answer is "YES" for 2 MONTHS IN A ROW, **notify the ADEM Groundwater Branch** as soon as possible.

Is the "TOTAL GALLONS OVER OR SHORT" **LARGER** than "LEAK CHECK #2" result? **YES NO** (circle one)
If your answer is "YES" for ANY 1 MONTH, **notify the ADEM Groundwater Branch** as soon as possible.

KEEP THIS PIECE OF PAPER ON FILE FOR AT LEAST 1 YEAR

What Should You Do to Operate and Maintain Your Manual Tank Gauging Method?

This method may be used only for tanks of 1000 gallons or less capacity meeting certain requirements. These requirements (tank size, tank dimension, and test time) are found in the manual tank gauging record on page 19. Manual tank gauging involves taking your tank out of service for the testing period (at least 36 hours) each week, during which the contents of the tank are measured twice at the beginning and twice at the end of the test period. The measurements are then compared to weekly and monthly standards to determine if the tank is tight.

Manual Tank Gauging **(for tanks 1000 gallons or less only)**	
Perform These O&M Actions	❑ **Once a week, record two inventory readings at the beginning of the test, allow the tank to sit undisturbed for the time specified in the "Manual Tank Gauging Record" on page 19, and record two inventory readings at the end of the test.** Record the readings on the "Manual Tank Gauging Record" form, or on an equivalent form. You may want to obtain the booklet "Manual Tank Gauging" from ADEM, which provides instructions on how to properly record and reconcile inventory readings. ❑ **Reconcile the numbers weekly.** Reconcile these readings using the "Manual Tank Gauging Record" form on page 19, or on an equivalent form. ❑ **At the end of 4 weeks, reconcile your records for the monthly standard and record the result.** Reconcile these readings using the "Manual Tank Gauging Record" form on page 19, or on an equivalent form. ❑ **Ensure that your measuring stick can measure to the nearest one-eighth inch and can measure the level of product over the full range of the tank's height.** You should check your measuring stick periodically to make sure that you can read the markings and numbers and that the bottom of the stick is not worn. ❑ **Make sure employees who run, monitor, or maintain the leak detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **Keep your manual tank gauging records for at least 1 year.** *Unless you are recording actual leak detection results weekly and at least every 30 days and maintaining records for at least 1 year, you are not doing leak detection right.*
Report a Suspected Leak	❑ **If your manual tank gauging ever indicates a suspected release, see Section 6 of this booklet for information on what to do next.** A suspected release is when the reconciliation results of either the weekly or monthly manual tank gauging exceed the standards listed on the "Manual Tank Gauging Record" form, or there is evidence of unusual/erratic operating conditions.

What Should You Do to Operate and Maintain Your Manual Tank Gauging and Tank Tightness Testing Method?

This temporary method combines manual tank gauging with periodic tank tightness testing. It may be used only for tanks of 2,000 gallons or less capacity. Manual tank gauging involves taking your tank out of service for the testing period (at least 36 hours) each week, during which the contents of the tank are measured twice at the beginning and twice at the end of the test period. The measurements are then compared to weekly and monthly standards to determine if the tank is tight. This combined method also includes tightness testing, a sophisticated test performed by trained professionals.

NOTE: This combination method can only be used temporarily for up to 10 years after installing a new UST or for up to 10 years after your tank meets the corrosion protection requirements.

Tank testing equipment must have been 3rd party certified and approved by ADEM. Call ADEM if you are unsure whether or not the equipment you are using is approved.

Manual Tank Gauging and Tank Tightness Testing (for tanks 2,000 gallons or less only)	
Perform These O&M Actions	❑ **Once a week, record two inventory readings at the beginning of the test, allow the tank to sit undisturbed for the time specified in the "Manual Tank Gauging Record" form on the next page, and record two inventory readings at the end of the test.** Record the readings on the "Manual Tank Gauging Record" form, or on and equivalent form. You may want to obtain the booklet "Manual Tank Gauging" from ADEM, which provides instructions on how to properly record and reconcile inventory readings. ❑ **Reconcile the numbers weekly.** Reconcile these readings using the "Manual Tank Gauging Record" form on the next page, or on an equivalent form. ❑ **At the end of 4 weeks, reconcile your records for the monthly standard and record the result.** Reconcile these readings using the "Manual Tank Gauging Record" form on the next page, or on an equivalent form. ❑ **Have a tank tightness test conducted at least every 5 years.** This testing needs to be conducted by a professional trained and certified by the equipment manufacturer in performing tank tightness testing. Complete and submit the appropriate ADEM tightness test report Form #s 483-487 to ADEM. These forms are available from ADEM's web site at www.adem.alabama.gov. ❑ **Ensure that your measuring stick can measure to the nearest one-eighth inch and can measure the level of product over the full range of the tank's height.** You should check your measuring stick periodically to make sure that you can read the markings and numbers and that the bottom of the stick is not worn. ❑ **Make sure employees who run, monitor, or maintain the leak detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **Keep your manual tank gauging records for at least 1 year.** *Unless you are recording actual leak detection results at least weekly and every 30 days and maintaining records for at least 1 year, you are not doing leak detection right.* ❑ **Keep the results of your most recent tightness test.** The appropriate ADEM tightness test report Form #s 483-487 must be kept on file and a copy submitted to ADEM.
Report a Suspected Leak	❑ **If your tank tightness testing or manual tank gauging ever indicate a suspected release, see Section 6 of this booklet for information on what to do next.** A suspected release is when a single tightness test fails, the reconciliation results of either the weekly or monthly manual tank gauging exceed the standards listed on the "Manual Tank Gauging Record" form, or there is evidence of unusual/erratic operating conditions.

MANUAL TANK GAUGING RECORD

MONTH _____ YEAR _____

TANK IDENTIFICATION: _____

PERSON COMPLETING FORM:_____

FACILITY NAME:_____

Circle your tank size, test duration, and weekly/monthly standards in the table below:

Tank Size	Minimum Duration Of Test	Weekly Standard (1 test)	Monthly Standard (4-test average)
up to 550 gallons	36 hours	10 gallons	5 gallons
551-1,000 gallons (when tank diameter is 64")	44 hours	9 gallons	4 gallons
551-1,000 gallons (when tank diameter is 48")	58 hours	12 gallons	6 gallons
551-1,000 gallons (also requires periodic tank tightness testing)	36 hours	13 gallons	7 gallons
1,001-2,000 gallons (also requires periodic tank tightness testing)	36 hours	26 gallons	13 gallons

Compare your weekly readings and the monthly average of the 4 weekly readings with the standards shown in the table on the left.

If the calculated change exceeds the weekly standard, the UST may be leaking. Also, the monthly average of the 4 weekly test results must be compared to the monthly standard in the same way.

If either the weekly or monthly standards have been exceeded, the UST may be leaking. As soon as possible, call the ADEM Groundwater Branch to report the suspected leak and get further instructions.

Start Test (month, day, and time)	First Initial Stick Reading	Second Initial Stick Reading	Average Initial Reading	Initial Gallons (convert inches to gallons) [a]	End Test (month, day, and time)	First End Stick Reading	Second End Stick Reading	Average End Reading	End Gallons (convert inches to gallons) [b]	Change In Tank Volume In Gallons + or (-) [a-b]	Tank Passes Test (circle YES or NO)
Date: Time: AM/PM					Date: Time: AM/PM						Y N
Date: Time: AM/PM					Date: Time: AM/PM						Y N
Date: Time: AM/PM					Date: Time: AM/PM						Y N
Date: Time: AM/PM					Date: Time: AM/PM						Y N
									To see how close you are to the monthly standard, divide the sum of the 4 weekly readings by 4 and enter result here >		Y N

KEEP THIS PIECE OF PAPER ON FILE FOR AT LEAST 1 YEAR

What Should You Do to Operate and Maintain Your Automatic Line Leak Detection System?

Automatic line leak detectors are designed to detect a catastrophic leak from pressurized piping. They must be designed to detect a leak of 3 gallons per hour at a line pressure of 10 psi within 1 hour. When a leak is detected, automatic line leak detectors must shut off the product flow, restrict the product flow, or trigger an audible or visual alarm. **After August 6, 2008, automatic line leak detectors must either shut off the product flow, restrict product flow, or shut down the submersible pump.**

NOTE: Mechanical automatic line leak detectors need to be installed and operated as close as possible to the tank (They are designed to detect a leak and restrict flow only between the detector and the dispenser).

Automatic line leak detectors must have been 3rd party certified and approved by ADEM. Call ADEM if you are unsure whether or not the equipment you are using is approved.

Automatic Line Leak Detectors (for pressurized piping only)	
Perform These O&M Actions	❑ **At least annually, you are required to test your automatic line leak detector according to the manufacturer's instructions to make sure it is functioning properly.** Don't assume that your leak detection system is working and never needs checking. Some monitoring systems have a "test" or "self-diagnosis" mode. Record the test results on "ADEM Line Leak Detector (LLD) Test Report Form" # 551. These forms are available from ADEM's web site at www.adem.alabama.gov. ❑ **Periodically have a qualified UST contractor, such as the vendor who installed your leak detection system, service all the system components according to the manufacturers' service instructions.** Components can wear out and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. ❑ **Make sure employees who run, monitor, or maintain the leak detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **For at least a year, keep results that demonstrate the automatic line leak detector is functioning properly on "ADEM Line Leak Detector (LLD) Test Report Form" # 551.** ❑ **Keep all records of calibration, maintenance, and repair of your leak detection equipment for at least 1 year.**
Report a Suspected Leak	❑ **If your automatic line leak detector ever indicates a suspected release, see Section 6 of this booklet for information on what to do next.** A suspected release is when there is a significant reduction in flow (for mechanical automatic line leak detectors), pump shut down or alarm condition (for electronic automatic line leak detectors), or there is evidence of unusual/erratic operating conditions.

What Should You Do to Operate and Maintain Your Line Tightness Testing Method or System?

This type of leak detection uses a periodic line tightness test to determine if your piping is leaking. Tightness testing can be performed by either a trained professional or by the use of a permanently installed electronic system (sometimes connected to an automatic tank gauging system).

Line tightness test equipment must have been 3rd party certified and approved by ADEM. Call ADEM if you are unsure whether or not the equipment you are using is approved.

Line Tightness Testing (for piping only)	
Perform These O&M Actions	❑ **If line tightness testing is used for pressurized piping, the test must be conducted at least annually.** ❑ **If line tightness testing is used for suction piping, the test must be conducted at least every three years.** "Safe" suction piping, as described on the next page, does not need leak detection testing. ❑ **Line tightness testing must be conducted by a professional trained in performing line tightness testing or by using a permanently installed electronic system.** When testing is conducted by a professional tester: • The tester must be a professional trained and certified by the equipment manufacturer in performing line tightness testing. • The test results must be submitted to ADEM on "ADEM UST Line Tightness Test Report Form" # 477. These forms are available from ADEM's web site at www.adem.alabama.gov. ❑ **Periodically have a qualified UST contractor, such as the vendor who installed your leak detection system, service all the system components according to the manufacturers' service instructions.** Components can wear out and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. ❑ **Make sure employees who run, monitor, or maintain the leak detection system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **Keep results of your leak detection system tests for at least 1 year.** Your monitoring equipment may provide printouts that can be used as records. *Unless you are recording actual leak detection results at least every 30 days and maintaining records for at least 1 year, you are not doing leak detection right.* ❑ **If you use a line tightness test, "ADEM UST Line Tightness Test Report Form" # 477 must be kept on file and a copy submitted to ADEM.** ❑ **If you use a permanently installed electronic system, keep all records of calibration, maintenance, and repair of your equipment for at least 1 year.**
Report a Suspected Leak	❑ **If your line tightness testing ever indicates a suspected release, see Section 6 of this booklet for information on what to do next.** A suspected release is when a single line tightness test fails, or there is evidence of unusual/erratic operating conditions.

What Should You Do to Operate and Maintain Your "Safe" Suction Piping System?

When the following suction piping design requirements are met, the piping system is considered "safe" and no other methods of leak detection are required to be performed on the piping:

- There is only one check valve per line located directly below the dispenser.
- The tank is lower than the dispenser.
- The piping slopes back to the tank.
- The tank system operates under atmospheric pressure.

"Safe" Suction Piping (for suction piping only)	
Perform These O&M Actions	❑ **Periodically have a qualified UST contractor, such as the vendor who installed your tank system, service all the system components according to the manufacturers' service instructions.** Components can wear out and must be checked periodically. Many vendors recommend or require this maintenance activity at least annually. ❑ **Make sure employees who run, monitor, or maintain the UST system know exactly what they have to do and to whom to report problems.** Develop and maintain regular training programs for all employees.
Keep These O&M Records	❑ **Keep all records of repair of your equipment for at least 1 year.**
Report a Suspected Leak	❑ **If your "safe" suction system indicates a suspected release, see Section 6 of this booklet for information on what to do next.** A suspected release is when product fails to flow immediately, the pump makes unusual noises when first turned on, or there are unusual/erratic operating conditions.

SECTION 3
Spill and Overfill Protection

The purpose of spill and overfill protection equipment is to eliminate the potential for a release during fuel deliveries. The equipment must be in working order and used properly to provide adequate protection from spills and overfills.

Even the best spill and overfill protection equipment can become faulty over time if not properly operated and maintained.

Only one gallon of fuel leaking each week from a poorly maintained spill catchment basin (also called spill bucket) can result in up to 195 tons of contaminated soil in a year.

Improper maintenance of the spill catchment basin/spill bucket at the UST site pictured below contributed to significant contamination of soil and groundwater.

The following pages in this section focus on how you can routinely make sure your spill and overfill equipment is being maintained and operated effectively.

What's the Difference Between Spill Protection and Overfill Protection?

Spill Protection:
A spill catchment basin/spill bucket is installed at the fill pipe to contain the drips and spills of fuel that can occur when the delivery hose is uncoupled from the fill pipe after delivery.

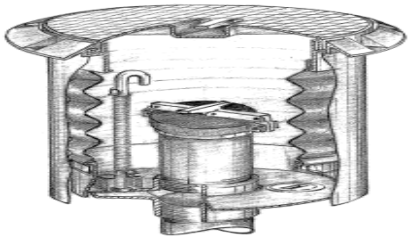
Overfill Protection:
Equipment is installed on the UST that is designed to stop product flow, reduce product flow, or alert the delivery person during delivery before the tank becomes full and begins releasing petroleum into the environment.

What are the Basics of Spill Protection?

Your USTs must have spill catchment basins (also called spill buckets) installed at the fill pipe to contain spills that may occur as a result of fuel deliveries. Spill catchment basins/spill buckets must be tested annually.

- The spill catchment basin/spill bucket is designed to temporarily contain product spills that might occur during fuel delivery. To contain a spill, the spill catchment basin/spill bucket must be liquid tight.
- **The spill catchment basin/spill bucket is not designed to contain fuel for long periods of time** and must be quickly emptied and contents disposed of properly.
- Spill catchment basins/spill buckets need to be large enough to contain any fuel that may spill when the delivery hose is uncoupled from the fill pipe. Spill catchment basins/spill buckets typically range in size from 5 gallons to 25 gallons.
- If you use a checklist for correct filling practices like the one on page 31, spills should be eliminated or reduced to very small volumes that your spill catchment basin/spill bucket can easily handle.

If your UST <u>never</u> receives deliveries of more than 25 gallons at a time, the UST does not need to meet the spill protection requirements. Many used oil tanks fall into this category. Even though these USTs are not required to have spill protection, you should consider using spill protection as part of good UST system management.



CATCHMENT BASIN

What Should You Do To Maintain Your Spill Catchment Basin/Spill Bucket?

The checklist below provides information on properly maintaining your spill catchment basin/spill bucket.

Spill Catchment Basin/Spill Bucket	
Perform These O&M Actions	❑ **Keep your spill catchment basin/spill bucket empty of liquids.** Some spill catchment basins/spill buckets are equipped with a valve that allows you to drain accumulated fuel into your UST. Others may be equipped with a manual pump so fuel can be put into your UST by pumping it through the fill pipe. However, keep in mind that when you pump out or drain your spill catchment basin/spill bucket into your UST, any water and debris may also enter the UST. If a spill catchment basin/spill bucket is not equipped with drain valve or pump, then any accumulated fuel or water must be removed manually and disposed of properly. ❑ **Periodically check the spill catchment basin/spill bucket lids.** Check to make sure they are not cracked and that they seal properly. ❑ **Periodically check your spill catchment basin/spill bucket to remove any debris.** Debris could include soil, stones, or trash. ❑ **Annually test your spill catchment basin/spill bucket.** The test can be performed by an owner or qualified UST Contractor. Clean the spill catchment basin/spill bucket and look for signs of wear, cracks, or holes (do not run the test if cracks or holes are found). Make sure the fill pipe cap and drain valve (if applicable) seal tightly to prevent water from entering the tank. Add enough liquid to completely fill the spill catchment basin/spill bucket. It fails the test if the liquid level drops by one quarter inch or more after at least one hour. If the test fails or if there are cracks or holes, repair or replace the spill catchment basin/spill bucket.
Keep These O&M Records	❑ **Keep a log of the results of the annual tests for at least one year.** You can use the "ADEM Spill Catchment Basin/Spill Bucket Monitoring Annual Test Log" form which is included on the next page.
Report a Suspected Leak	❑ **If there is evidence, or you suspect that product was released from the spill catchment basin/spill bucket, see Section 6 of this booklet for information on what to do next.**

ADEM File Code **SPILLT__ __ _____**

ADEM
SPILL CATCHMENT BASIN/SPILL BUCKET
ANNUAL TEST LOG FOR YEAR _____

Questions on how to complete this form should be directed to the Groundwater Branch, UST Compliance Unit at (334) 270-5655

Facility Name:	Owner:
Address:	Address:
City, County, Zip Code:	City, State, Zip Code:
Facility I.D. #:	Phone #:

Tester Name:	Tester Company:	Tester Phone #:

ADEM Spill Catchment Basin/Spill Bucket Test Procedure

Clean the spill catchment basin/spill bucket and add enough liquid to completely fill the basin. If the liquid level drops by one quarter inch or more after at least one hour, the spill catchment basin/spill bucket fails the test. If the test fails, proceed as follows:

1. Do not fill the tank until after the spill catchment basin/spill bucket is repaired or replaced.
2. Repair or replace the spill catchment basin/spill bucket.
3. If there is evidence, or you suspect that product was released from the spill catchment basin/spill bucket, contact the ADEM Corrective Action Section at 334/270-5655 to report a suspected or confirmed release as soon as possible (within 24 hours).

ADEM Unique Tank #						
Product Stored						
Lid in good condition and seals properly?	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)
Water removed from basin? (If yes, dispose of properly)	(yes) (no)(n/a)	(yes) (no)(n/a)	(yes) (no)(n/a)	(yes) (no)(n/a)	(yes) (no)(n/a)	(yes) (no)(n/a)
Fuel removed from basin? (If yes, dispose of properly)	(yes) (no)(n/a)	(yes) (no)(n/a)	(yes) (no)(n/a)	(yes) (no)(n/a)	(yes) (no)(n/a)	(yes) (no)(n/a)
Trash and debris removed from basin?	(yes) (no)(n/a)	(yes) (no)(n/a)	(yes) (no)(n/a)	(yes) (no)(n/a)	(yes) (no)(n/a)	(yes) (no)(n/a)
Drain valve operational?	(yes) (no)(n/a)	(yes) (no)(n/a)	(yes) (no)(n/a)	(yes) (no)(n/a)	(yes) (no)(n/a)	(yes) (no)(n/a)
Fill pipe cap seals properly?	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)
Basin free of cracks or holes? (if no, it fails without testing)	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)
Date of test Test start time Test end time	/ / ___:___(a)(p)m ___:___(a)(p)m	/ / ___:___(a)(p)m ___:___(a)(p)m	/ / ___:___(a)(p)m ___:___(a)(p)m	/ / ___:___(a)(p)m ___:___(a)(p)m	/ / ___:___(a)(p)m ___:___(a)(p)m	/ / ___:___(a)(p)m ___:___(a)(p)m
Results of test	(pass)(fail) (inconclusive)	(pass)(fail) (inconclusive)	(pass)(fail) (inconclusive)	(pass)(fail) (inconclusive)	(pass)(fail) (inconclusive)	(pass)(fail) (inconclusive)
Initials of tester						

Repairs Needed	Date of Repair or Replacement	Description of any Repairs

What are the Basics of Overfill Protection?

Your USTs must have overfill protection installed to help prevent the overfilling of tanks.

Three types of overfill protection devices are commonly used:

- Automatic Shutoff Devices
- Overfill Alarms
- Ball Float Valves

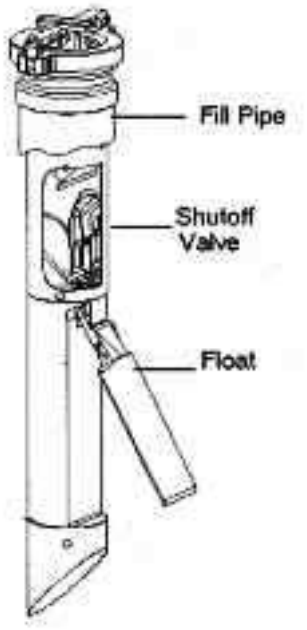
Each of these forms of overfill protection is discussed in detail on the following pages.

If your UST never receives deliveries of more than 25 gallons at a time, the UST does not need to meet the overfill protection requirements. Many used oil tanks fall into this category. Even though these USTs are not required to have overfill protection, you should consider using overfill protection as part of good UST system management.

What Should You Do to Operate and Maintain Your Automatic Shutoff Device?

The automatic shutoff device is a mechanical device installed in line with the drop tube within the fill pipe riser. It slows down and then stops the delivery when the product has reached a certain level in the tank. It should be positioned so that the float arm is not obstructed and can move through its full range of motion.

When installed and maintained properly, the shutoff valve will shut off the flow of fuel to the UST at 95% of the tank's capacity or before the fittings at the top of the tank are exposed to fuel.



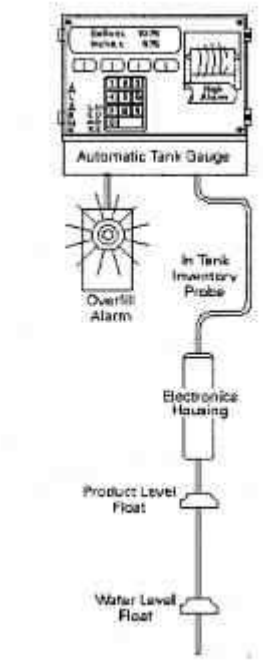
You should <u>not</u> use an automatic shutoff device for overfill protection if your UST receives pressurized deliveries.

Automatic Shutoff Device	
Perform These O&M Actions	❑ **Have a qualified UST contractor periodically check to make sure that the automatic shutoff device is functioning properly and that the device will shut off fuel flowing into the tank at no more than 95% of the tank capacity:** • Make sure the float operates properly. • Make sure that there are no obstructions in the fill pipe that would keep the floating mechanism from working. ❑ **Post signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and alarms in use at your facility.**

What Should You Do to Operate and Maintain Your Electronic Overfill Alarm?

This type of overfill device activates an audible and/or visual warning to delivery personnel when the tank is either 90% full or is within one minute of being overfilled. **The alarm must be located so that it can be seen and/or heard from the UST delivery location.** Once the electronic overfill alarm sounds, the delivery person has approximately one minute to stop the flow of fuel to the tank.

Electronic overfill alarm devices have no mechanism to shut off or restrict flow. Therefore, the fuel remaining in the delivery hose after the delivery has been stopped will flow into the tank as long as the tank is not yet full.



When this type of overfill device is used, it is highly recommended that a tank tightness test be performed after installation to ensure that the top of the tank is air tight.

Electronic Overfill Alarm	
Perform These O&M Actions	❑ **Have a qualified UST contractor periodically check your electronic overfill alarm to make sure that it is functioning properly and that the alarm activates when the fuel reaches 90% of the tank capacity:** • Ensure that the alarm can be heard and/or seen from where the tank is fueled. • Make sure that the electronic device and probe are operating properly. ❑ **Post signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and alarms in use at your facility.**

What Should You Do to Operate and Maintain Your Ball Float Valve?

The ball float valve, also called a float vent valve, is installed at the vent pipe in the tank and restricts vapor flow in an UST as the tank gets close to being full. The ball float valve should be set at a depth which will restrict vapor flow out of the vent line during delivery at 90% of the UST's capacity.

As the tank fills, the ball in the valve rises, restricting the flow of vapors out of the UST during delivery. The flow rate of the delivery will decrease noticeably and should alert the delivery person to stop the delivery.

For ball float valves to work properly, the top of the tank must be air tight so that vapors cannot escape from the tank. Everything from fittings to drain mechanisms on spill buckets must be tight and be able to hold the pressure created when the ball float valve engages.

When this type of overfill device is used, it is highly recommended that a tank tightness test be performed after installation to ensure that the top of the tank is air tight.

You should <u>not</u> use a ball float valve for overfill protection if any of the following apply:

- **Your UST receives pressurized deliveries.**
- **Your UST system has suction piping.**
- **Your UST system has single point (coaxial) stage 1 vapor recovery.**

Ball Float Valve	
Perform These O&M Actions	❑ **Have a qualified UST contractor periodically check to make sure that the ball float valve is functioning properly and that it will restrict fuel flowing into the tank at 90% of the tank capacity:** • Ensure that the air hole is not plugged. • Make sure the ball cage is still intact. • Ensure the ball still moves freely in the cage. • Make sure the ball still seals tightly on the pipe. ❑ **Post signs that the delivery person can easily see and that alert the delivery person to the overfill warning devices and alarms in use at your facility.**

How Can You Help the Delivery Person Avoid Spills and Overfills?

As an owner or operator you are responsible for ensuring that releases due to spills and overfills do not occur during fuel delivery. To protect your business, you must make every effort to help the delivery person avoid these problems.

Overfills are caused when the delivery person makes a mistake, such as ignoring an overfill alarm.

Make Sure You Order the Right Amount of Product for Delivery. Order only the quantity of fuel that will fit into 90% of the tank. Use the checklist on the next page to ensure that the amount of product to be delivered will fit into the available empty space in the tank. If correct filling practices are used, you will not exceed the UST's capacity.

USE THE CHECKLIST FORMULA ON THE NEXT PAGE FOR <u>EVERY</u> DELIVERY.

DO YOUR HOMEWORK RIGHT AND YOU REDUCE THE CHANCE OF OVERFILLS!

Ensure that the transfer operation is monitored constantly to prevent overfilling and spilling. One way to help ensure the above requirements are met is to follow the checklist on the next page. The checklist describes necessary activities before, during, and after a fuel delivery.

Use signs to alert your delivery person. The delivery person should know what type of overfill device is present on each tank at your facility and what action will occur if the overfill device is triggered, such as a visual and/or audible alarm, or that the product flow into the tank will stop or slow significantly.

EDUCATE AND ALERT YOUR DELIVERY PERSON BY PLACING A CLEAR SIGN NEAR YOUR FILL PIPES, IN PLAIN VIEW OF THE DELIVERY PERSON!

THE FOLLOWING IS AN EXAMPLE OF A SIGN YOU MAY WANT TO USE.

DELIVERY PERSON — AVOID OVERFILLS

- An **overfill alarm** is used for overfill protection at this facility.
- Do not tamper with this alarm in any attempt to defeat its purpose.
- When the tank is 90% full, the overfill alarm sounds and a red light flashes.
- **If you hear the alarm sound or see the red light flashing,**

STOP THE DELIVERY IMMEDIATELY!

Correct Filling Checklist	
What to Do Before Filling Your USTs	❑ **Post clear signs that alert delivery persons to the overfill devices and alarms in use at your facility.** ❑ **Make and record accurate readings for product and water in the tank before fuel delivery.** ❑ **Order only the quantity of fuel that will fit into 90% of the tank.** **REMEMBER, the formula for determining the maximum amount of gasoline to order is:** (Tank capacity in gallons X 90%) - Product currently in tank = Maximum amount of fuel to order **Example:** (10,000 gal X 0.9) - 2,000 gal = 7,000 gal maximum amount to order ❑ **Ensure fuel delivery personnel know the type of overfill device present at the tank and what actions to perform if it activates.** For example, use the sample sign on the previous page. ❑ **Review and understand the spill response procedures.** ❑ **Verify that your spill bucket is empty, clean, and will contain spills.**
What to Do While Your USTs are Being Filled	❑ **Keep fill ports locked until the fuel delivery person requests access.** ❑ **Have an accurate tank capacity chart available for the fuel delivery person.** ❑ **The fuel delivery person makes all hook-ups.** The person responsible for monitoring the delivery should remain attentive and observe the entire fuel delivery, be prepared to stop the flow of fuel from the truck to the UST at any time, and respond to any unusual condition, leak, or spill which may occur during delivery. ❑ **Have response supplies readily available for use in case a spill or overfill occurs (see Section 6).** ❑ **Provide safety barriers around the fueling zone.** ❑ **Make sure there is adequate lighting around the fueling zone.**
What to Do After Filling Your USTs	❑ **Following complete delivery, the fuel delivery person is responsible for disconnecting all hook-ups.** ❑ **Return spill response kit and safety barriers to proper storage locations.** ❑ **Make and record accurate readings for product and water in the tank after fuel delivery.** ❑ **Verify the amount of fuel received.** ❑ **Make sure fill ports are properly secured.** ❑ **Ensure the spill bucket is free of product and clean up any small spills.**

MAKE SURE YOU REPORT ALL SPILLS AND OVERFILLS IN ACCORDANCE WITH SECTION 6 OF THIS BOOKLET!

SECTION 4
Containment Sumps

There are several types of containment sumps. There are under dispenser sumps, submersible pump sumps, transition sumps and intermediate sumps. All sumps contain some length of piping.

The purpose of all containment sumps is to hold an accumulation of fuel that results from maintenance of the UST piping system or drips or leaks from the piping system within the sumps until the fuel can be removed, prior to any fuel leaking into the environment. If containment sumps are used as an integral part of the double wall piping's open interstitial monitoring leak detection system (see page 7), these sumps must also contain primary piping leaks that drain into the sump through the piping's interstitial space, and they must remain free of water.

Beginning August 6, 2007, Inspection of Submersible Pump and Under Dispenser Sumps is Required Annually.

Since sumps are not designed to contain fuel for long periods of time, fuel in the sumps needs to be removed within 24 hours of discovery.

Lack of proper maintenance of containment sumps at UST sites can result in a significant soil and groundwater contamination.

What Should You Do To Maintain Your Containment Sumps?

The checklist below provides information on properly maintaining your sumps.

Containment Sumps	
Perform These O&M Actions	❑ **Keep your containment sumps empty of fuels.** Fuel needs to be removed within 24 hours of discovery. Accumulated fuel must be disposed of properly. ❑ **Periodically check to see if your containment sumps are still liquid tight.** Have a qualified UST contractor inspect your sumps for signs of wear, cracks, or holes. Based on this inspection, the contractor may suggest a test to determine if the sump is tight or needs repair or replacement. ❑ **Annually inspect your containment sumps.** • Check the sump lids to make sure they fit properly and seal out water. • Clean trash and debris from inside the sumps, remove any accumulation of liquids, and make any necessary repairs to prevent leakage of fuel into the sumps. Accumulated fuel and/or contaminated water must be disposed of properly. • Check the condition of penetration seals and boots, and repair or replace if cracked, torn, punctured or compromised in any way. • Check the condition and the mounting position of any sensors, and consider performing the annual test on the sensor during the inspection. Repair, replace, or adjust the position of the sensor as necessary. • Check the condition of the piping. For metal piping, look for severe corrosion; for fiberglass piping, look for cracks or delamination; and for flexible piping, look for soft, spongy, discolored, or degraded piping and make sure there are no abnormal bends, cracks, kinks, bulging, swelling, or growing. If any of these problems are noted, have a qualified UST contractor check the piping and repair or replace when necessary. • If a sump is used as part of an open interstitial monitoring system; make sure the piping interstitial space is open to the sump in case there is a leak in the primary piping; if there are test boots on the piping, confirm that they are positioned to allow the interstitial space to be open to the sump; and if there is leakage of water into the sump, repair or replace the sump to prevent further leakage. • Based on this inspection, a qualified UST contractor may suggest a test to determine if the sump is tight or needs repair or replacement. If the test finds any breaches in the sump, immediately repair or replace the sump as necessary.
Keep These O&M Records	❑ **Keep a log of the results of the annual inspection for at least one year.** You can use the "ADEM Containment Sumps Annual Monitoring Log" form which is included on the next page.
Report a Suspected Leak	❑ **If there is evidence, or you suspect that product was released from any containment sump, see Section 6 of this booklet for information on what to do next.**

ADEM File Code **SUMPI** __ __ _____

ADEM
ANNUAL CONTAINMENT SUMP INSPECTION LOG FOR YEAR _____

Questions on how to complete this form should be directed to the Groundwater Branch, UST Compliance Unit at (334) 270-5655

Facility Name:	Owner:
Address:	Address:
City, County, Zip Code:	City, State, Zip Code:
Facility I.D. #:	Phone #:

Inspector Name:	Inspector Company:	Inspector Phone #:

ADEM Unique Tank # or Dispenser #						
Product Stored (N/A for dispenser)						
Date of inspection	/ /	/ /	/ /	/ /	/ /	/ /
Type of sump inspected	(sub pump) (intermediate) (dispenser)	(sub pump) (intermediate) (dispenser)	(sub pump) (intermediate) (dispenser)	(sub pump) (intermediate) (dispenser)	(sub pump) (intermediate) (dispenser)	(sub pump) (intermediate) (dispenser))
Lid tight and properly seals out water? (n/a for under dispenser sumps) (circle correct answers)	(yes) (no) (n/a)	(yes) (no) (n/a)	(yes) (no) (n/a)	(yes) (no) (n/a)	(yes) (no) (n/a)	(yes) (no) (n/a)
Sump free of water?	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)
Sump free of fuel?	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)
Sump cleaned out?	(yes) (no) (n/a)	(yes) (no) (n/a)	(yes) (no) (n/a)	(yes) (no) (n/a)	(yes) (no) (n/a)	(yes) (no) (n/a)
Sump free of breaches?	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)
Sump components free of dripping or leaking fuel?	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)
All penetrations (boots, conduits, etc) into sump in good condition?	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)
Piping interstitial space open, or test boots positioned, to allow product to enter sump from primary piping?	(yes) (no) (n/a)	(yes) (no) (n/a)	(yes) (no) (n/a)	(yes) (no) (n/a)	(yes) (no) (n/a)	(yes) (no) (n/a)
Sensors in good condition and positioned correctly?	(yes) (no) (n/a)	(yes) (no) (n/a)	(yes) (no) (n/a)	(yes) (no) (n/a)	(yes) (no) (n/a)	(yes) (no) (n/a)
During sump inspection, **were sump sensors tested?** If yes, provide sump sensor test results	(yes) (no) (Pass)(Fail)	(yes) (no) (Pass)(Fail)	(yes) (no) (Pass)(Fail)	(yes) (no) (Pass)(Fail)	(yes) (no) (Pass)(Fail)	(yes) (no) (Pass)(Fail)
Piping in good condition?	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)	(yes) (no)
Initials of inspector						

Repairs Needed	**Date of Repair or Replacement**	**Description of any Repairs**

SECTION 5
Corrosion Protection

What is Corrosion Protection?

To prevent leaks, all parts of your UST system that are underground and routinely contain product need to be protected from corrosion. The UST system includes the tank, piping, and ancillary equipment, such as flexible connectors, fittings, and pumps. Unprotected metal UST components can deteriorate and leak when underground electrical currents act upon them.

One way to protect UST components from corrosion is to **make them with nonmetallic, noncorrodible materials**, such as USTs made of (or clad or jacketed with) fiberglass reinforced plastic (FRP) or other noncorrodible materials, as illustrated by the FRP tank on the right. Noncorrodible USTs like these do not require O&M for corrosion protection.

UST components made from metal that routinely contain product (such as tanks, piping, flexible connectors, fittings, and pumps) and are in direct contact with the ground need corrosion protection provided by cathodic protection or (in some cases) lining the interior of the tank.

Metal tanks (that are not clad or jacketed) and metal piping installed after December 22, 1988 must have a dielectric coating (a coating that does not conduct electricity) and cathodic protection.

What Corrosion Protection Choices Do You Have?

The following table describes the options that are available to protect your UST system from corrosion.

Corrosion Protection Option	Corrosion Protection Description
Nonmetallic, Noncorrodible Material	The tank or piping is constructed of nonmetallic, noncorrodible material.
Steel Tank Clad or Jacketed with a Nonmetallic, Noncorrodible Material	Examples of cladding or jacket material include fiberglass and a thick urethane coating. Does not apply to piping.
Coated and Cathodically Protected Steel Tanks or Piping	Steel tank and piping is well-coated with a dielectric material and cathodically protected.
Cathodically Protected Noncoated Steel Tanks or Piping	This option was only for steel tanks and piping installed before December 22, 1988 and cathodically protected before December 22, 1998*. Cathodic protection is usually provided by an impressed current system.
Internal Lining of Tanks	This option was only for steel tanks installed before December 22, 1988 and lined before December 22, 1998*. A lining is applied to the inside of the tank. Does not apply to piping.
Combination of Cathodically Protected Steel and Internal Lining of Tanks	This option is only for steel tanks installed before December 22, 1988*. Cathodic protection is usually provided by an impressed current system. Does not apply to piping.

*These methods may still be used as methods to repair steel tanks.

How Can You Make Sure Your Corrosion Protection is Continuing to Protect Your UST?

If you don't understand your corrosion protection O&M responsibilities and don't know what O&M tasks you must routinely perform, you may allow your UST site to become contaminated. As a result, you may face cleanup costs and associated problems.

To avoid these problems, use the checklists on the following pages that describe each type of corrosion protection method, discuss actions necessary for proper O&M, and note the records you should keep.

Locate the method of corrosion protection you are using at your facility, review these pages, and if applicable, periodically complete the checklist. You might want to copy a page first and periodically fill out copies later.

You will find the "ADEM Impressed Current Cathodic Protection System 60-day Inspection Log" form on page 38 of this section. Keeping an inspection log and testing records increases the likelihood that you are conducting good O&M on your corrosion protection system and your UST site. "ADEM Cathodic Protection Monitoring Form for Galvanic Systems" # 545 and "ADEM Cathodic Protection Monitoring Form for Impressed Current Systems" # 332 can be found on ADEM's web site at www.adem.alabama.gov.

Questions about your corrosion protection system?

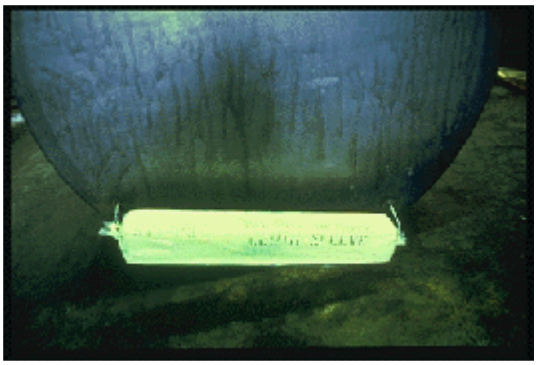
If you have questions about your corrosion protection system, call the vendor and/or installer of your system. The ADEM UST Compliance Unit may be able to provide assistance as well.

IF YOU ARE USING IMPRESSED CURRENT CATHODIC PROTECTION, NEVER ALLOW THE RECTIFIER TO BE TURNED OFF!

What Should You Do to Maintain Your Sacrificial Anode Cathodic Protection Anode System?

Sacrificial anodes are buried and attached to UST components for corrosion protection, as illustrated on the right by an anode attached to a tank. Anodes are pieces of metal that are more electrically active than steel, and thus they suffer the destructive effects of corrosion rather than the steel they are attached to.

However, once these anodes corrode away, the UST is no longer protected from corrosion. That is why it is so important to regularly test the corrosion protection system.

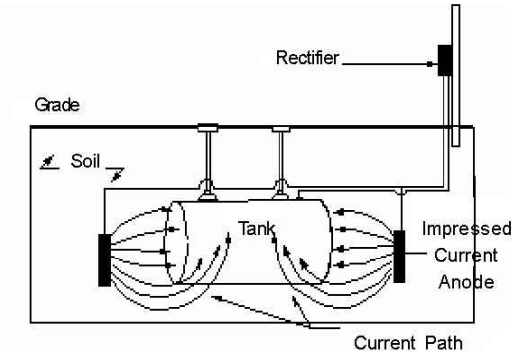


Sacrificial Anode Cathodic Protection System	
Perform These O&M Actions	❑ **Have your sacrificial anode cathodic protection system tested within 6 months of installation to make sure your cathodic protection system is adequately protecting your UST system.** It is best to test the system as soon as you can, but you have 6 months if needed. ❑ **After the initial test, have your sacrificial anode cathodic protection system tested at least every 3 years for the lifetime of the system.** Testing more frequently can catch problems before they become big problems. The National Association of Corrosion Engineers (NACE) recommends annual testing. ❑ **After any repairs to your UST system or any nearby construction, have your sacrificial anode cathodic protection system tested within 6 months.** Repair and construction activities may accidentally interfere with the proper operation of your system. ❑ **You are required to have the above tests performed by a "cathodic protection tester". Make sure that the tester is qualified to perform the test and follows a standard code of practice.** A cathodic protection tester is a person who can demonstrate an understanding of the principles and measurements of cathodic protection systems as applied to buried or submerged metal piping and tank systems; and have education and experience in soil resistivity, stray current, structure-to-soil potential, and component electrical isolation measurements of buried metal piping and tank systems. ❑ **"ADEM Cathodic Protection Monitoring Form for Galvanic Systems" # 545 must be completed by the cathodic protection tester and submitted to ADEM to document the test.** This form is available from ADEM's web site at www.adem.alabama.gov. ❑ **If any test indicates that your tanks are not adequately protected, you need to have a "corrosion expert" examine and fix your system**. A corrosion expert is, by reason of thorough knowledge of the physical sciences and the principles of engineering and mathematics acquired by a professional education and related practical experience, qualified to engage in the practice of corrosion control on buried or submerged metal piping systems and metal tanks. A corrosion expert must be accredited or certified as being qualified by NACE or be a registered professional engineer in the state of Alabama who has certification or licensing that includes education and experience in corrosion control of buried or submerged metal piping systems and metal tanks.
Keep These O&M Records	❑ **You need to keep the results of at least the last two tests on file.** Completed copies of the "ADEM Cathodic Protection Monitoring Form for Galvanic Systems" # 545 must be kept on file and a copy submitted to ADEM.

What Should You Do to Operate and Maintain Your Impressed Current Cathodic Protection System?

An impressed current system, as shown on the right, uses a rectifier to provide direct current through anodes to the tank and/or piping to achieve corrosion protection. The steel is protected because the current going to the steel overcomes the corrosion-causing current flowing away from it. **The cathodic protection rectifier must always be on and operating to protect your UST system from corrosion.**

Impressed current cathodic protection plans and specifications must have been prepared by an Alabama registered professional engineer and approved by ADEM prior to installation. Call ADEM if you are unsure whether or not your system is approved.



Impressed Current Cathodic Protection System

(With or Without Internal Lining)

Perform These O&M Actions

- ❑ **Have your impressed current cathodic protection system tested within 6 months of installation to make sure your cathodic protection system is adequately protecting your UST system.** It is best to test the system as soon as you can, but you have 6 months if needed.
- ❑ **After the initial test, have your impressed current system tested at least every 3 years for the lifetime of the system.** Testing more frequently can catch problems before they become big problems. The National Association of Corrosion Engineers (NACE) recommends annual testing.
- ❑ **After any repairs to your UST system or any nearby construction, have your impressed current system tested within 6 months.** Repair and construction activities may accidentally interfere with the proper operation of your system.
- ❑ **You are required to have the above tests performed by a "cathodic protection tester". Make sure that the tester is qualified to perform the test and follows a standard code of practice.** A cathodic protection tester is a person who can demonstrate an understanding of the principles and measurements of cathodic protection systems as applied to buried or submerged metal piping and tank systems; and have education and experience in soil resistivity, stray current, structure-to-soil potential, and component electrical isolation measurements of buried metal piping and tank systems.
- ❑ **"ADEM Cathodic Protection Monitoring Form for Impressed Current Systems" # 332 must be completed by the cathodic protection tester and submitted to ADEM to document the test.** This form is available from ADEM's web site at www.adem.alabama.gov.
- ❑ **If any test indicates that your tanks are not adequately protected, you need to have a "corrosion expert" examine and fix your system**. A corrosion expert is, by reason of thorough knowledge of the physical sciences and the principles of engineering and mathematics acquired by a professional education and related practical experience, qualified to engage in the practice of corrosion control on buried or submerged metal piping systems and metal tanks. A corrosion expert must be accredited or certified as being qualified by NACE or be a registered professional engineer in the state of Alabama who has certification or licensing that includes education and experience in corrosion control of buried or submerged metal piping systems and metal tanks.
- ❑ **You need to inspect your rectifier at least every 60 days to make sure that it is operating within normal limits.**
  - This inspection involves reading and recording the voltage and amperage readouts on the "ADEM Impressed Current Cathodic Protection System 60-Day Inspection Log" on the next page, or an equivalent form. You or your employees can perform this periodic inspection.
  - Make sure that the professional engineer who designed your cathodic protection system provides you with the rectifier's acceptable operating levels so that you can compare the actual rectifier readings with them. If your readings are not within acceptable levels, you need to contact a cathodic protection expert or professional engineer to address the problem.
- ❑ **You should have a trained professional periodically service your impressed current system.**
- ❑ **Never turn off your impressed current system rectifier!**

Keep These O&M Records

- ❑ **You need to keep the results of at least the last two tests on file.** Completed copies of the "ADEM Cathodic Protection Monitoring Form for Impressed Current Systems" # 332 must be kept on file and a copy submitted to ADEM.
- ❑ **You need to keep records of at least the last 3 rectifier readings.** See the next page for the "ADEM Impressed Current Cathodic Protection System 60-Day Inspection Log" form.

ADEM
IMPRESSED CURRENT CATHODIC PROTECTION SYSTEM
60-DAY INSPECTION LOG FOR YEAR _____

Questions on how to complete this form should be directed to the Groundwater Branch, UST Compliance Section at (334) 270-5655

Owner Information	
Facility Name:	Owner:
Address:	Address:
City, County, Zip Code:	City, State, Zip Code:
Facility I.D. Number:	Phone Number:

Rectifier Information	
Location of Rectifier at Facility:	Rectifier Design Output (Amps):

INSPECTION LOG

1. Inspections are required at least every 60 days.

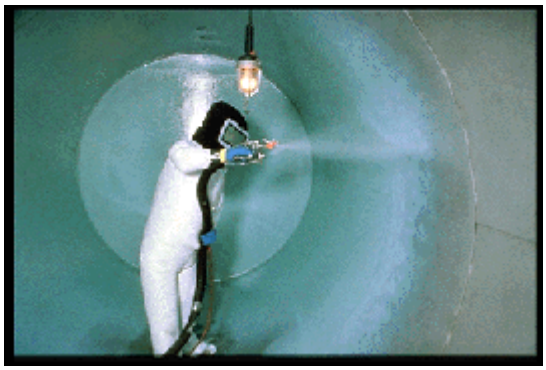
60 Day Inspection	Date Inspected	Inspector Initials	Rectifier Turned On?	Rectifier DC Output		Rectifier Clock Reading (Hours)
				Volts	Amps	
January						
February						
March						
April						
May						
June						
July						
August						
September						
October						
November						
December						

Date of any Repairs	**Description of any Repairs**

Comments

What Should You Do to Operate and Maintain Your Internal Lining Corrosion Protection System?

This corrosion protection option applies only to tanks installed before December 22, 1988. These older tanks were allowed to be internally lined until December 22, 1998 by trained professionals to meet the corrosion protection requirements, as shown on the right, in which a professional follows industry codes to safely and effectively line a tank's interior.



Internal Lining Corrosion Protection System	
Perform These O&M Actions	❑ **Within 10 years after lining your tank, the lined tank must be inspected by a trained professional and found to be structurally sound with the lining still performing according to original design specifications.** Make sure the professional performing the inspection follows a standard code of practice that has been found to be acceptable by ADEM. ❑ **Within 5 years after the first inspection of your tank lining and every 5 years thereafter, the lining must be inspected by a trained professional and found to be structurally sound with the lining still performing according to original design specifications.** Again, make sure the professional performing the inspection follows a standard code of practice that has been found to be acceptable by ADEM. ❑ **The "ADEM Interior Lining Inspection Report" Form # 403 must be completed by the inspector and submitted to ADEM to document the inspection.** This form is available from ADEM's web site at www.adem.alabama.gov.
Keep These O&M Records	❑ **Keep records of the inspection as specified in industry standards for lining inspections.** The most recent inspection should always be kept.

What if You Have an STI-P3 Tank with a PP4 Test Station?

If you have a PP4 test station installed with an STI-P3 tank, you may perform the periodic testing of your cathodic protection system by using the meter provided to you with the PP4 test station.

- Don't forget to record the result of the reading and keep at least the last two results.

- If your test readings do not pass, you must take action to correct the problem. Call your installer and ask that the corrosion expert who designed the system examine it and correct the problem.

What if You Combine Internal Lining with Cathodic Protection?

If you chose the combination of internal lining and cathodic protection for meeting corrosion protection requirements on your UST, you may not have to meet the periodic inspection requirement for the lined tank. However, you must always meet the requirements for checking and testing your cathodic protection system, as described in the checklists on the previous pages. The 10-year and subsequent 5-year inspections of the lined tank are not required if the integrity of the tank was ensured when cathodic protection was added. You should be able to show an inspector documentation of the passed integrity assessment.

Example 1:
If you have cathodic protection and internal lining applied to your tank at the same time, periodic inspections of the lined tank <u>are not</u> required because an integrity assessment of the tank is required prior to adding the cathodic protection and internal lining.

Example 2:
If you had cathodic protection added to a tank in 1997 that was internally lined in 1994 and the contractor did not perform an integrity assessment of the tank at the time cathodic protection was added (or you cannot show an inspector documentation of the passed integrity assessment), then periodic inspections of the lined tank <u>are</u> required because you cannot prove that the tank was structurally sound and free of corrosion holes when the cathodic protection was added. The lined tank needs to be periodically inspected because the lining may be the only barrier between your gasoline and the surrounding environment.

What if You Have a Double-Walled Steel UST with Interstitial Monitoring and Cathodic Protection?

If you have a cathodically protected double-walled steel tank and you use interstitial monitoring capable of detecting a breach in both the inner and outer wall or ingress of product and water as your method of leak detection, then you should monitor your cathodic protection system within six months of installation and following any activity that could affect the CP system.

If you are using impressed current cathodic protection, you still need to perform the 60-day checks of your rectifier to make sure that it is operating within normal limits.

- Testing the cathodic protection system more frequently may help catch problems sooner.

- If your test readings do not pass, you must take action to correct the problem. Call your installer and ask that the corrosion expert who designed the system examine it and correct the problem.

- Don't forget to keep at least the last two results of your cathodic protection testing.

SECTION 6
Temporarily Closed UST Systems

How To Undergo Temporary Closure? Temporary closure requirements allow an owner or operator to stop using a UST system (stop filling and dispensing product). Owners or operators must submit ADEM form 310 within 30 days of undergoing temporary closure. During the first 3 months of temporary closure, product may be left in the tank, but only if release detection systems and any required corrosion protection continue to be operated.

When a system is **temporarily closed for 3 months or more, the tank must be emptied (less than 1 inch of residue)**, vent lines must remain open and functioning, and all other lines, pumps, manways, and ancillary equipment must be capped and secured. All corrosion protection requirements must be met during the period of temporary closure. If the corrosion protection requirements are not met for a UST system that is temporarily closed, the Department may require that the USTs be properly closed in accordance with ADEM closure requirements. An extension may be applied for only after a site assessment is performed within the temporary closure period and submitted to the Department for approval.

Checklist for temporarily closed UST system:

☐ The tank(s) has been temporarily closed for 30 days or more and ADEM has received a completed ADEM form #310 Notice of UST Temporary Closure, or the bottom section of this page.

☐ The tank(s) has been emptied (less than 1 inch of residual), or has been temporarily closed for under 90 days and continues to have an approved method of release detection monitoring

☐ The temporarily closed UST system is designed of nonmetallic materials or continues to meet ADEM requirements for Cathodic Protection System monitoring and testing (see Section 5)

I. OWNERSHIP OF TANK(S)	II. LOCATION OF TANK(S)
Owner Name (Corporation, Individual, Public Agency, or Other Entity) _____ Mailing Address _____ City State Zip Code _____ Contact _____ Area Code Phone Number _____	Facility I. D. Number: ___ ___ ___ ___ ___ - ___ ___ ___ - ___ ___ ___ ___ ___ ___ Facility Name or Company Site Identifier, as applicable _____ Street, County Road, Highway, or State Road, as applicable _____ County _____ City(Nearest) State Zip Code _____

III. TANK(S) TEMPORARILY CLOSED

	Unique Tank # (if registered)	Date last used	Tank Size	Tank Contents
1				
2				
3				
4				
5				

Owner signature: _____ Date: _____

SECTION 7
Suspected or Confirmed Releases

You need to be fully prepared to respond to releases BEFORE they may occur. You need to know what to do when leak detection methods indicate a suspected or confirmed release. Be ready to take the following steps, as appropriate.

What Are You Required to Do to Stop a Release?

- Take immediate action to prevent the release of more product by contacting trained emergency response personnel.
- Turn off the power to the dispenser and "bag" the nozzle.
- Make sure you know where your emergency shutoff switch is located.
- Empty the tank, if necessary, without further contaminating the site. You may need the assistance of your supplier or distributor.

What Should You Do to Contain a Spill or Overfill?

You should keep enough absorbent material at your facility to contain a spill or overfill of petroleum products until trained emergency response personnel can respond to the incident. The suggested supplies include, but are not limited to, the following:

- Containment devices, such as containment booms, dikes, and pillows.
- Absorbent material, such as kitty litter, chopped corn cob, sand, and sawdust. (Be sure you properly dispose of used absorbent materials.)
- Mats or other material capable of keeping spill or overfill out of nearby storm drains.
- Spark-free flash light.
- Spark-free shovel.
- Buckets.
- Reels of "caution tape," traffic cones, and warning signs.
- Personal protective gear.

Also, identify any fire, explosion or vapor hazards and take action to neutralize these hazards.

If You Need Help, Who Do You Call?

Contact your local fire or emergency response authority. Make sure you have these crucial telephone numbers prominently posted where you and your employees can easily see them. See the next page for a form you can copy and post.

What Responsibilities Do You Have to Contact ADEM?

If you observe any of the following, contact the ADEM Corrective Action Section at 334/270-5655 to report a suspected or confirmed release as soon as possible (within 24 hours):

- Any spill or overfill of petroleum that exceeds 25 gallons or that causes a sheen on nearby surface water. (Spills and overfills under 25 gallons that are contained and immediately cleaned up do not have to be reported. If they cannot be quickly cleaned up they must be reported to ADEM.)

- Any released regulated substances at the UST site or in the surrounding area such as the presence of liquid petroleum, soil contamination, surface water or groundwater contamination, or petroleum vapors in sewer, basement, or utility lines.

- Any unusual operating conditions you observe such as erratic behavior of the dispenser, a sudden loss of product, or an unexplained presence of water in the tank. However, you are <u>not</u> required to report if:

    - The system equipment is found to be defective, but not leaking, and is immediately repaired or replaced.

- Results from your leak detection system indicate a suspected release. However, you are <u>not</u> required to report if:

    - The monitoring device is found to be defective and is immediately repaired, recalibrated, or replaced and further monitoring does not confirm the initial suspected release, or

    - In the case of inventory control, a second month of data does not confirm the initial result.

The next page contains a blank list for names and phone numbers of important contacts. Fill out this information for your facility so that you will know who to call in case of an emergency. Remove this page from the manual, copy it, fill it out, and post it in a prominent place at your facility.

COPY THE NEXT PAGE AND UPDATE IT OFTEN!

MAKE SURE EVERYONE AT YOUR UST FACILITY IS FAMILIAR WITH THIS LIST OF CONTACTS.

Release Response
Important Contact Information

Contact	Contact Name	Phone Number
ADEM		
Fire Department		
Ambulance		
Police Department		
Emerg. Response Contractor		
Repair Contractor		
Other Contacts		

Release Response Checklist

- ❑ **Stop the release.** Take immediate action to prevent the release of more product. Turn off the power to the dispenser and "bag" the nozzle. Make sure you know where your emergency shutoff switch is located. Empty the tank, if necessary, without further contaminating the site.
- ❑ **Contain the spill or overfill.** Contain, absorb, and clean up any surface releases. Identify any fire, explosion or vapor hazards and take action to neutralize these hazards.
- ❑ **Call for help and to report suspected or confirmed releases.** Contact your local fire or emergency response authority. Contact the ADEM UST Corrective Action Section at 334/270-5655 within 24 hours.

SECTION 8
Frequent Walk-Through Inspections

You should conduct basic walk-through inspections of your facility **at least monthly** to make sure that your essential equipment is working properly and that you have release response supplies on hand.

These inspections would not be as thorough as following the O&M checklists presented earlier in this booklet, but they can provide a quick overview you can do more often than the longer checklists. You might think of this level of inspection as sort of like the dashboard indicators we respond to in our automobiles that provide us with status warnings like "low battery."

What Should You Check During Your Walk-Through Inspection?

When you perform your walk-through inspection you should quickly check at least the following:

- **Leak Detection System:** Is your leak detection equipment working properly? For example, did you run a quick "self-test" of the ATG to verify it's working properly? Or did you check your manual dip stick to make sure it's not warped or worn?
- **Spill Catchment Basins/Spill Buckets:** Are spill catchment basins/spill buckets clean, empty, and in good shape (free of cracks or holes)?
- **Overfill Alarm (if you have one):** Is your overfill alarm working and easily seen or heard?
- **Impressed Current Cathodic Protection System (if you have one):** Is your cathodic protection system turned on? Are you checking your rectifier at least every 60 days?
- **Fill and Monitoring Ports:** Are covers and caps tightly sealed and secured?
- **Spill and Overfill Response Supplies:** Do you have the appropriate supplies for cleaning up a spill or overfill?

In addition, good UST site management should also include the following quick visual checks:

- **Dispenser Hoses, Nozzles, and Breakaways:** Are they in good condition and working properly?
- **Dispenser and Dispenser Sumps:** Are dispenser sumps clean, empty, and in good shape (free of cracks or holes)? Any signs of leaking?
- **Piping Sumps:** Are piping sumps clean, empty, and in good shape (free of cracks or holes)? Any signs of leaking?

If you find any problems during the inspection, you or your UST contractor needs to take action quickly to resolve these problems and avoid serious releases.

COPY THE NEXT PAGE AND USE IT AT LEAST ONCE A MONTH.

IF YOU EVER SUSPECT OR CONFIRM A LEAK DURING YOUR WALK-THROUGH INSPECTION, REFER TO SECTION 6!

Frequent Walk-Through Inspection Checklist						
List of Systems to Inspect	**Initial and date each box below to indicate that the device/system was inspected and OK on that date.**					
Leak Detection System: Inspect for proper operation.						
Spill Buckets: Ensure spill buckets are clean and empty and free of cracks or holes.						
Overfill Alarm: Inspect for proper operation. Can a delivery person hear or see the alarm when it alarms?						
Impressed Current System: Inspect to make sure the rectifier is turned on and has an amp output similar to its original reading.						
Fill and Monitoring Ports: Inspect all fill/monitoring ports and other access points to make sure that the covers and caps are tightly sealed and secured.						
Spill and Overfill Response Supplies: Inventory and inspect the emergency spill response supplies. If the supplies are low, restock the supplies. Inspect supplies for deterioration and improper functioning.						
Dispenser Hoses, Nozzles, and Breakaways: Inspect for loose fittings, deterioration, obvious signs of leakage, and improper functioning.						
Dispenser and Dispenser Sumps: Open each dispenser and inspect all visible piping, fittings, and couplings for any signs of cracks holes or leakage. If any water or product is present, remove it and dispose of it properly. Remove any debris from the sump.						
Piping Sumps: Inspect all visible piping, fittings, and couplings for any signs of leakage or deterioration. Ensure the sumps are clean and empty and free of cracks or holes. If any water or product is present, remove it and dispose of it properly. Remove any debris from the sump.						

REPORT ANY SUSPECTED LEAK FOUND DURING THIS INSPECTION!

REFER TO SECTION 6 OF THIS BOOKLET.

SECTION 9
For More Information

This section identifies UST program contacts and other resources that can help answer your questions and provide you with information about good UST management.

What Internet Resources Are Available to You?

Government Links

- ADEM Internet Web Site: http://www.adem.alabama.gov
- Directory of State UST Program Contacts: http://www.epa.gov/oust/states/statcon1.htm
- Directory of State UST Program Internet Sites: http://www.epa.gov/oust/states/stateurl.htm
- U.S. Environmental Protection Agency's Office of Underground Storage Tanks Home Page: http://www.epa.gov/oust. To go directly to the compliance assistance section of the home page, go to: http://www.epa.gov/swerust1/cmplastc/index.htm
- Tanks Subcommittee of the Association of State and Territorial Solid Waste Management Officials (ASTSWMO): http://www.astswmo.org/tanks.htm
- New England Interstate Water Pollution Control Commission (NEIWPCC): http://www.neiwpcc.org

Professional and Trade Association Links

- American Petroleum Institute (API): http://www.api.org
- American Society of Testing and Materials (ASTM): http://www.astm.org
- Fiberglass Tank and Pipe Institute (FTPI): http://www.fiberglasstankandpipe.com
- NACE International - The Corrosion Society: http://www.nace.org
- National Fire Protection Association (NFPA): http://www.nfpa.org
- Petroleum Equipment Institute (PEI): http://www.pei.org
- Steel Tank Institute (STI): http://www.steeltank.com
- Underwriters Laboratories (UL): http://www.ul.com

How Do You Obtain ADEM and EPA Information?

ADEM Information

- Go to ADEM's Web site at http://www.adem.alabama.gov to read or download UST Compliance and Corrective Action documents
- If you do not have access to the internet, contact the ADEM Groundwater Switchboard at 334/270-5655 and ask that the form be mailed to you.

EPA Information

- Go to EPA's Web site at http://www.epa.gov/swerust1/pubs/index.htm to order, read, or download EPA UST documents online.
- Write and ask for **free** publications by addressing your request to EPA's publication distributor: National Service Center for Environmental Publications (NSCEP), Box 42419, Cincinnati, OH 45242.
- For **free** copies, call EPA's publication distributor's **toll-free** number at (800) 490-9198 or fax (513) 489-8695.